



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Office of Airport Planning and Programming

800 Independence Ave., SW.  
Washington, DC 20591

**MAR 02 2015**

Mr. David Redszus  
Noise Technical Director  
Suburban O'Hare Commission  
[REDACTED]  
[REDACTED]

Dear Mr. Redszus:

This letter is in response to your questions concerning the Part 150 Program, the Integrated Noise Model (INM) and the Community Noise Equivalent Level (CNEL) that you sent to the FAA's Office of Environment and Energy late in 2014.

### **Part 150**

Airports may collaboratively address noise near airports by using a voluntary program called Airport Noise Compatibility Planning or Part 150. The program is known as Part 150 because the Federal Aviation Administration (FAA) implemented the program authorized by the Aviation Safety and Noise Abatement Act of 1979 under title 14 CFR part 150. The program began in 1981. It provides a structured approach for airport operators, airlines, pilots, neighboring communities, and FAA to work together to reduce the number of people who live in significantly noise-impacted areas. Operators of public use airports, including heliports, are eligible to participate.

Through the Part 150 process, airport operators may consider a variety of different strategies to reduce noise. Changes in operational procedures such as take-offs or landings or routing flight paths over less noise sensitive areas can lower noise levels. Airports also may choose to purchase land near airports to maintain compatible land use or provide sound insulation for homes, schools and other buildings near the airport that meet the required standards.

Approximately 275 airports have entered into this voluntary program since its beginning. Of these, 134 have updated their plans and other airport operators are working on updates.

### **How It Works**

A Part 150 Program has two parts. The first step is to develop noise exposure maps that identify the compatible and non-compatible land uses around the airport. The maps help communities understand the areas affected by different levels of noise in a consistent and scientific way. This enables better land-use planning and noise mitigation efforts in the

second step of the Part 150 process, which leads to a Noise Compatibility Program (NCP). The NCP identifies specific measures to reduce incompatible land uses.

When the program identifies the compatible land uses, such as industrial or commercial areas, large highways or water, the airport operator can ask FAA to see if it is possible to develop air traffic arrival or departure procedures that help reduce noise by routing flights over those less-populated, less noise-sensitive areas.

The airport operator also may provide sound insulation for homes, schools, and places of worship that meet specific criteria or construct noise barriers, such as concrete walls or earthen berms. In some cases where homes are severely affected by noise near the airport, the program may identify opportunities for an airport operator to purchase property to convert to more compatible land uses. It can also identify areas where the airport operator can work with local officials to ensure zoning policies are in place to ensure compatible land use near the airport.

Airports that participate in the Part 150 program are eligible to receive Airport Improvement Program (AIP) funds to help with noise mitigation for non-compatible land uses and sound insulation.

### **Sound Insulation under Part 150**

The noise exposure maps developed in the first part of the Part 150 process help identify neighborhoods in which buildings are eligible for sound insulation because of the outside noise levels. However, a building also must have a specific interior noise level to meet the eligibility requirements for sound insulation and must be the type of construction that can successfully be sound-insulated. Not all homes or schools near an airport are eligible for sound insulation.

The FAA can provide AIP grant funding for an airport operator's Part 150 sound insulation program. The grant program requires a local match from the airport or other grant recipient, and has a number of other Federal requirements. Airports also can seek FAA approval to use Passenger Facility Charge revenues for noise mitigation, including funding for the local share of AIP grants. Airports also may use airport revenue for noise mitigation in noise-impacted areas.

### **Public Participation**

The Part 150 program requires that members of the public have an opportunity for active and direct participation in the process through public meetings and hearings, and to provide comments in response to required public notices including local newspapers and Federal Register notices. The Part 150 program also provides opportunities for people living in noise impacted areas to participate on technical committees and general committees.

Airport operators do not have to use the Part 150 program to reduce noise. Many airports have established highly successful noise abatement or mitigation programs outside of the



Part 150 process, by working proactively with neighboring communities and user groups to address the same objectives. In some cases, airport operators simply prefer to work more directly with the various stakeholders without relying upon a Federal regulatory process.

### **Landing fee penalties imposed on excessively loud aircraft**

Imposition of noise-based landing fee penalties would be covered under the Airport Noise and Capacity Act of 1990, or ANCA. ANCA mandated the creation of a national program for reviewing airport noise and access restrictions on the operations of Stage 2 and Stage 3 aircraft. Congress determined that community noise concerns have led to uncoordinated and inconsistent restrictions on aviation which could impede the national air transportation system. U.S. airlines and aircraft manufacturers had made significant strides toward reducing aircraft noise at the source, by developing and deploying quieter aircraft throughout the commercial fleet. In return for that investment, it was important to the airlines that airports have clear parameters for when they could impose restrictions. In September 1991, FAA established title 14 CFR part 161, Notice and Approval Requirements for Airport Noise and Access Restriction.

ANCA identifies the required analyses and conditions for approval of proposed restrictions. This includes an analysis of the restriction based on six statutory conditions that must be supported by substantial evidence in order for FAA to approve a noise based restriction.

The six conditions are:

- The proposed restriction is reasonable, nonarbitrary, and nondiscriminatory.
- The proposed restriction does not create an undue burden on interstate or foreign commerce.
- The proposed restriction maintains safe and efficient use of the navigable airspace.
- The proposed restriction does not conflict with any existing Federal statute or regulations.
- The applicant has provided adequate opportunity for public comment on the proposed restriction.
- The proposed restriction does not create an undue burden on the national aviation system.

### **Community Noise Equivalent Level (CNEL)**

The Community Noise Equivalent Level (CNEL) metric, like the day/night average sound level (DNL) metric, represents the average sound level over a 24-hour period, with factors to reflect the increased sensitivity to noise and lower ambient sound levels at night. Both CNEL and DNL account for the noise level of each individual aircraft event, the number of times those events occur, and the period of day/night in which they occur. Both noise metrics logarithmically average aircraft sound levels over a complete 24-hour period, with a 10 decibel (dB) adjustment added to those noise events occurring from 10 p.m. to 7 a.m. Another way of describing this calculation is that each flight between 10 p.m. and 7 a.m. is counted as 10 flights. CNEL also includes a 4.77 dB adjustment added to noise events

occurring during the evening from 7 p.m. to 10 p.m. (in other words, every evening flight is counted as three flights).

CNEL was adopted as a required noise metric for airport communities by the State of California in 1970. In 1974, the U.S. Environmental Protection Agency (EPA) recommended DNL (also expressed as  $L_{dn}$ ) as the best metric to describe the effects of environmental noise in a simple, uniform, and appropriate way. EPA concluded that DNL is essentially the same as CNEL, and that for most airports, the numerical difference between a two-period and three-period day are on the order of several tenths of a decibel at most.<sup>1</sup>

The FAA adopted DNL as its standard metric in 1981 for purposes of determining the cumulative exposure of individuals to noise and land use compatibility under title 14 CFR part 150,<sup>2</sup> and also uses DNL as its primary metric for noise analysis under the National Environmental Policy Act (NEPA). However, FAA recognizes CNEL as an alternative metric for California, and has allowed California airports to present annual noise exposure in terms of CNEL, rather than DNL, for consistency with State protocols. The FAA's experience with CNEL in California and DNL elsewhere over the past three decades suggests that the metrics are functionally equivalent. Adoption of CNEL by Illinois for the State-required noise monitoring reports would not trigger any automatic update of noise analyses prepared for Federal programs. The FAA has not evaluated the implications of accepting CNEL as an alternative metric for the Part 150 program or NEPA analyses outside of California.

### **Integrated Noise Model (INM)**

The Integrated Noise Model (INM) is the required noise modeling tool in federally funded civil airport noise impact studies<sup>3</sup>. Inputs to INM include aircraft fleet mix, runway usage, day/night operation percentages, and flight operations. INM can be used to determine the noise implication of any changes in the inputs from a baseline condition. The modeling efforts include preparation of fleet and flight operation data and other model setups as well as the actual model runs. INM modeling is typically conducted by expert acoustic consultants with support from sponsors such as the FAA or airport authorities. INM software is able to compute the CNEL metric as well as DNL. The FAA's INM model is available at:

[https://www.faa.gov/about/office\\_org/headquarters\\_offices/apl/research/models/inm\\_model/](https://www.faa.gov/about/office_org/headquarters_offices/apl/research/models/inm_model/).

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<sup>1</sup> U.S. Environmental Protection Agency Office of Noise Abatement and Control, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (Mar. 1974), p. A-15.

<sup>2</sup> The Aviation Safety and Noise Abatement Act (ASNA) of 1979 required the FAA to establish a single system for measuring noise and determining the exposure of individuals to noise to be uniformly applied in measuring noise at airports and the areas surrounding such airports. 49 U.S.C. § 47502(1)(A)(B), (2), (3).

<sup>3</sup> INM will be updated to the Aviation Environmental Design Tool version 2b (AEDT 2b) in Summer 2015. Any information provided here regarding INM is pertinent to AEDT also. Information on AEDT can be found at: <https://aedt.faa.gov/>.



The INM model has been developed based on domestic and international standards. An example of these standards is the Society of Automotive Engineers (SAE), Committee A-21, Aircraft Noise, Aerospace Information Report (AIR) No. 1845, Procedure for the Computation of Airplane Noise in the Vicinity of Airports. Over the years, various validation studies have been conducted.

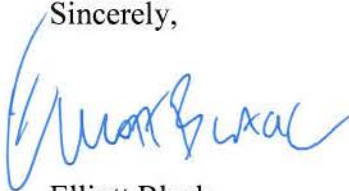
The aircraft noise and aircraft performance data are often developed and provided by aircraft manufacturers, in which case a standard data submittal form is used. Before a set of new aircraft data is formally released in the INM, the INM development team checks the data integrity and consistency, and often compares INM prediction with noise certification levels. Apart from the data checks, FAA's tool development team also conducts uncertainty quantification (UQ) when releasing FAA's future modeling tools such as the Aviation Environmental Design Tool (AEDT). Information on the UQ work can be found at: <https://aedt.faa.gov/ProductReleases.aspx> under AEDT 2a Documentation.

Field measurement data has also been used to validate the INM modeling. An example of such study is a comprehensive data collection from the Denver International Airport and the subsequent data-model comparison analysis. Information from the most recent study can be found in the Detailed Weather and Terrain Analysis for Aircraft Noise Modeling report at: <http://ntl.bts.gov/lib/51000/51500/51557/DOT-VNTSC-FAA-14-08.pdf>. Section 2 has the results of the study and Section 5 lists data sets from other field measurement campaigns, both in the US and in other countries that have been used to validate INM.

The Fly Quiet Program was included in the INM modeling for the O'Hare Modernization Environmental Impact Statement (EIS). Discussion of Fly Quiet in the EIS can be found in Section 5.1 of the EIS, pages 5.1-67 and 5.1-68, available at: [http://www.faa.gov/airports/airport\\_development/omp/eis/feis/Media/Section%205.01.pdf](http://www.faa.gov/airports/airport_development/omp/eis/feis/Media/Section%205.01.pdf), and in the Record of Decision for the EIS, pages 47-48, at: [http://www.faa.gov/airports/airport\\_development/omp/eis/rod/Media/ORD\\_ROD\\_Final.pdf](http://www.faa.gov/airports/airport_development/omp/eis/rod/Media/ORD_ROD_Final.pdf).

We trust this information responds to your specific questions.

Sincerely,



Elliott Black  
Director, Office of Airport Planning  
and Programming

cc: Barry Cooper, Great Lakes Regional Administrator  
Christina Drouet, Great Lakes Acting Deputy Regional Administrator  
Susan Mowery-Schalk, Airports Division Manager, Great Lakes Region  
Rebecca Cointin, Manager, Noise Division, Office of Environment and Energy